

Dehydration of methyl phenyl carbinol catalyzed by modified active aluminum oxide

Lamberov A., Gil'Manov K., Egorova S., Trifonov S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The effect of modification with metal salts and acids on the acid-base characteristics and the catalytic properties of active aluminum oxide in the reaction of methyl phenyl carbinol dehydration to styrene was studied using the IR spectroscopy of adsorbed base molecules. The surface treatment of γ -Al₂O₃ with chromium and nickel cations decreased the catalyst activity because of the occurrence of hydrogenation side reactions. The appearance of strong Bronsted and Lewis acid sites as a result of modification with sulfate, nitrate, and fluoride anions accelerated the deactivation of the catalyst. Upon modification with acetic acid solutions, additional Lewis acid sites with $Q_{CO} = 33.5\text{--}34$ kJ/mol were formed on the surface of aluminum oxide, and the concentration of strong basic sites with $PA = 900$ kJ/mol decreased; this facilitated an increase in the catalyst activity and a decrease in the rate of catalyst deactivation.
© 2007 Pleiades Publishing, Ltd.

<http://dx.doi.org/10.1134/S0040579507050399>
